

REMARKS

The Office Action of November 17, 2004, has been received and its contents reviewed. Prior to the Office Action, claims 1-6 were pending in this application. By this Amendment, claims 1-6 have been amended. These amendments correct minor typographical errors. No new matter has been added. Thus, claims 1-6 remain pending for consideration. By the actions above and the remarks below, Applicants respectfully request reconsideration and allowance of all pending claims.

Claim Rejections under 35 U.S.C. § 112, second paragraph

Claims 1-6 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants traverse.

In particular, the Office asserts that “isothiazoline” is misspelled in claims 1-6. Claims 1 and 4 are amended to correct this typographical error, and the term “isothiazoline” has been deleted from claims 2-3 and 5-6. In addition, the Office asserts that the term “The method” in claims 2-3 and 5-6 lacks antecedent basis since claims 1 and 4 are directed to “An industrial disinfectant composition”. However, claims 2-3 and 5-6 as amended are each directed to an “industrial disinfectant composition”. Thus, Applicants submit that these rejections are overcome, and respectfully request that these rejections be withdrawn.

Claim Rejections under 35 U.S.C. § 102(b)

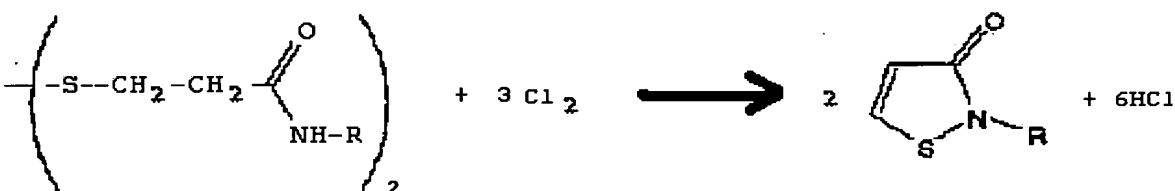
Claims 1-6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by: Lewis et al. (U.S. Patent 3,849,430 – Lewis I), Kim et al. (GB 2,308,364), Bayer et al. (U.S. Patent 5,420,290), Hahn et al. (U.S. Patent 5,453,507), Yen et al. (U.S. Patent 5,290,512), Jordan (DE 3702546), or Lewis et al. (U.S. Patent 3,523,121 – Lewis II). Applicants traverse.

In particular, the Office asserts that each of the above prior art discloses at least one product that is embraced by the instant claimed invention. Specifically, the Office references the following in making this rejection:

- Lewis I – See Ex. 2 in Col. 5;

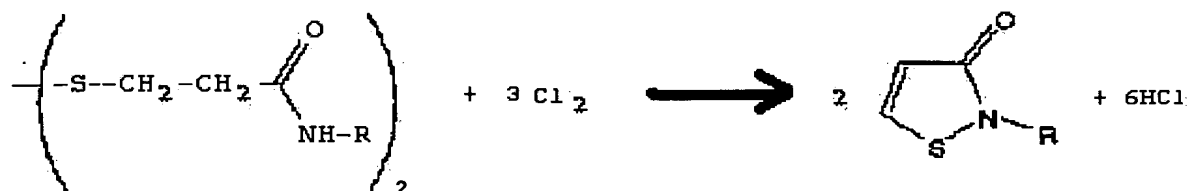
- Kim et al. – See the products of Reaction Scheme 5 on p. 12;
- Bayer et al. – See, for instance, the compound in col. 15, lines 49-50;
- Hahn et al. – See, for instance, Example 19 in column 9;
- Yen et al. – See Example II in column 3;
- Jordan – See, for example, the first compound on page 4, lines 1-9; and
- Lewis II – See, for instance, Example 45 in columns 7 and 8.

However, independent claim 1 specifically recites an industrial disinfectant composition comprising, as an effective component, a 2-alkyl-4-isothiazoline-3-one represented by the formula (III), which is obtained by reacting the compound represented by formula (II), with chlorine as a chlorinating agent in dichloromethane as a solvent, in which hydrogen chloride is insoluble or exhibits low solubility, at a temperature of 39-41°C, according the following formula wherein R in the compounds of formulae (II) and (III) represents an alkyl group or aralkyl group of C1 to C8, and wherein the amount of a 5-chloro-2-alkyl-4-isothiazoline-3-one contained in the 2-alkyl-4-isothiazoline-3-one produced is less than 0.1%.



Similarly, independent claim 4 specifically recites an industrial disinfectant composition comprising, as an effective component, a 2-alkyl-4-isothiazoline-3-one represented by the formula (III), which is obtained by reacting the compound represented by formula (II), with chlorine as a chlorinating agent in dichloromethane as a solvent, in which hydrogen chloride is insoluble or exhibits low solubility, at a temperature of 39-41°C, according the following reaction formula, filtrating a hydrochloride salt of the compound of formula (III) obtained from the reaction of the compound of formula II with chlorine, and washing the hydrochloride salt with a solvent which is inert to the hydrochloride salt and in which the hydrochloride salt exhibits low solubility, wherein R in the compounds of formulae

(II) and (III) represents an alkyl group or aralkyl group of C1 to C8, and wherein the amount of a 5-chloro-2-alkyl-4-isothiazoline-3-one contained in the 2-alkyl-4-isothiazoline-3-one produced is less than 0.1%.



Thus, the claims of the present invention are product-by-process claims which are directed to an industrial disinfectant composition comprising, as an effective component, a 2-alkyl-4-isothiazoline-3-one, in which the amount of the contaminant, a 5-chloro-2-alkyl-4-isothiazoline-3-one is less than 0.1%. To the contrary, the products described in the above-cited references contain a 5-chloro-2-alkyl-4-isothiazoline-3-one in an amount far more than 0.1%. None of the references disclose an industrial disinfectant composition comprising, as an effective component, a 2-alkyl-4-isothiazoline-3-one, in which the amount of the contaminant, a 5-chloro-2-alkyl-4-isothiazoline-3-one is less than 0.1%.

Moreover, accordingly to the present invention, in producing the intended product, the specific combination of dichloromethane as a solvent and the reaction temperature in the range of 39-41°C is used, which enable limiting formation of the detrimental contaminant, 5-chloro-2-alkyl-4-isothiazoline-3-one, to a level of less than 0.1%. The above combination of the specific solvent and the specific reaction temperature is not disclosed or even remotely suggested in any of the cited references. Further, none of the cited references discloses limiting formation of the detrimental contaminant, 5-chloro-2-alkyl-4-isothiazoline-3-one, to a level of less than 0.1%.

Therefore, Applicants submit that independent claims 1 and 4 are not anticipated by any of Lewis et al. (U.S. Patent 3,849,430 – Lewis I), Kim et al. (GB 2,308,364), Bayer et al. (U.S. Patent 5,420,290), Hahn et al. (U.S. Patent 5,453,507), Yen et al. (U.S. Patent 5,290,512), Jordan (DE 3702546), or Lewis et al. (U.S. Patent 3,523,121 – Lewis II) under 35 U.S.C. § 102(b) because the references fail to teach each and every feature of the claimed invention. In addition, Applicants also submit that claims 2-3 and 5-6 are not anticipated by any of Lewis et al. (U.S. Patent 3,849,430 – Lewis I), Kim et al. (GB 2,308,364), Bayer et al.

(U.S. Patent 5,420,290), Hahn et al. (U.S. Patent 5,453,507), Yen et al. (U.S. Patent 5,290,512), Jordan (DE 3702546), or Lewis et al. (U.S. Patent 3,523,121 – Lewis II) under 35 U.S.C. § 102(b) by virtue of their dependency on claims 1 and 4. Accordingly, Applicants respectfully request that these rejections be withdrawn.

Claim Rejections under 35 U.S.C. § 103(a)

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lewis et al. (U.S. Patent 3,849,430 – Lewis I), Bayer et al. (U.S. Patent 5,420,290), Hahn et al. (U.S. Patent 5,453,507), Yen et al. (U.S. Patent 5,290,512), Jordan (DE 3702546), or Lewis et al. (U.S. Patent 3,523,121 – Lewis II), each taken alone and in combination with each other when similar utilities are asserted. Applicant traverse.

In particular, the Office asserts that Applicants are claiming 2-alkyl-4-isothiazoline-3-one products, and that Lewis I, Bayer et al., Hahn et al., Yen et al., Jordan, and Lewis II each teach 2-alkyl-4-isothiazoline-3-one products that are either structurally the same as or structurally similar to the instant claimed compounds. Furthermore, the Office asserts that the difference between some of the products of the prior art and the products instantly claimed is that the instant claimed products are generically taught in the prior art. In addition, the Office asserts that the motivation to make the claimed products derives from the expectation that structurally similar products would possess similar activity (e.g., a disinfectant). Moreover, the Examiner asserts that one skilled in the art would thus be motivated to prepare products embraced by the prior art to arrive at the instant claimed products with the expectation of obtaining additional beneficial products which would be useful as a disinfectant, and that the instant claimed invention would have been suggested to one skilled in the art and therefore, the instant claimed invention would have been obvious to one skilled in the art.

However, as stated above, the claims of the present invention are product-by-process claims which are directed to an industrial disinfectant composition comprising, as an effective component, a 2-alkyl-4-isothiazoline-3-one, in which the amount of the contaminant, a 5-chloro-2-alkyl-4-isothiazoline-3-one is less than 0.1%. To the contrary, the products described in the above-cited references contain a 5-chloro-2-alkyl-4-isothiazoline-3-one in an amount far more than 0.1%. None of the references, taken alone or in combination,

disclose an industrial disinfectant composition comprising, as an effective component, a 2-alkyl-4-isothiazoline-3-one, in which the amount of the contaminant, a 5-chloro-2-alkyl-4-isothiazoline-3-one is less than 0.1%.

Moreover, Applicants have conducted experimentation in which dichloromethane was used as the solvent in the reaction and the reaction temperature was varied in the range of 30-41°C. These experiments verified the effectiveness in operating in the 39-41°C temperature range. The experiments also confirmed that products produced by methods other than the method employing the specific combination of dichloromethane as a solvent and the reaction temperature in the range of 39-41°C according to the claims of the present invention, inevitably contain the detrimental contaminant, 5-chloro-2-alkyl-4-isothiazoline-3-one, to a level far more than 0.1%, and that the requirement of the amount of the contaminant, a 5-chloro-2-alkyl-4-isothiazoline-3-one, being less than 0.1% is not met by the products described in the cited references.

In addition, even if the teachings of the references are combined, the processes described therein would still yield a product containing far more than 0.1% of the detrimental contaminant, 5-chloro-2-alkyl-4-isothiazoline-3-one.

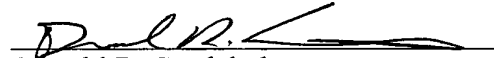
Furthermore, there are distinct and unexpected benefits achieved by limiting the formation of the detrimental contaminant, 5-chloro-2-alkyl-4-isothiazoline-3-one, to a level less than 0.1%. In particular, in view of mutagenicity, the level of 5-chloro-2-alkyl-4-isothiazoline-3-one's should be such that there is no mutagenic effect on the body, and it is also preferred that the level of 5-chloro-2-alkyl-4-isothiazoline-3-one's be as low as possible even within the range of no mutagenic effect. Thus, achieving a level of 5-chloro-2-alkyl-4-isothiazoline-3-one's of less than 0.1% is completely sufficient and far superior to the levels achieved by the prior art.

Therefore, Applicants submit that claims 1-6 are not unpatentable under 35 U.S.C. § 103(a) over Lewis et al. (U.S. Patent 3,849,430 – Lewis I), Bayer et al. (U.S. Patent 5,420,290), Hahn et al. (U.S. Patent 5,453,507), Yen et al. (U.S. Patent 5,290,512), Jordan (DE 3702546), or Lewis et al. (U.S. Patent 3,523,121 – Lewis II), each taken alone and in combination with each other when similar utilities are asserted. Accordingly, Applicants respectfully request that these rejections be withdrawn.

In view of the amendments and arguments set forth above, Applicants respectfully request reconsideration and withdrawal of all the pending rejections.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise which could be eliminated through discussions with Applicants' representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,



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